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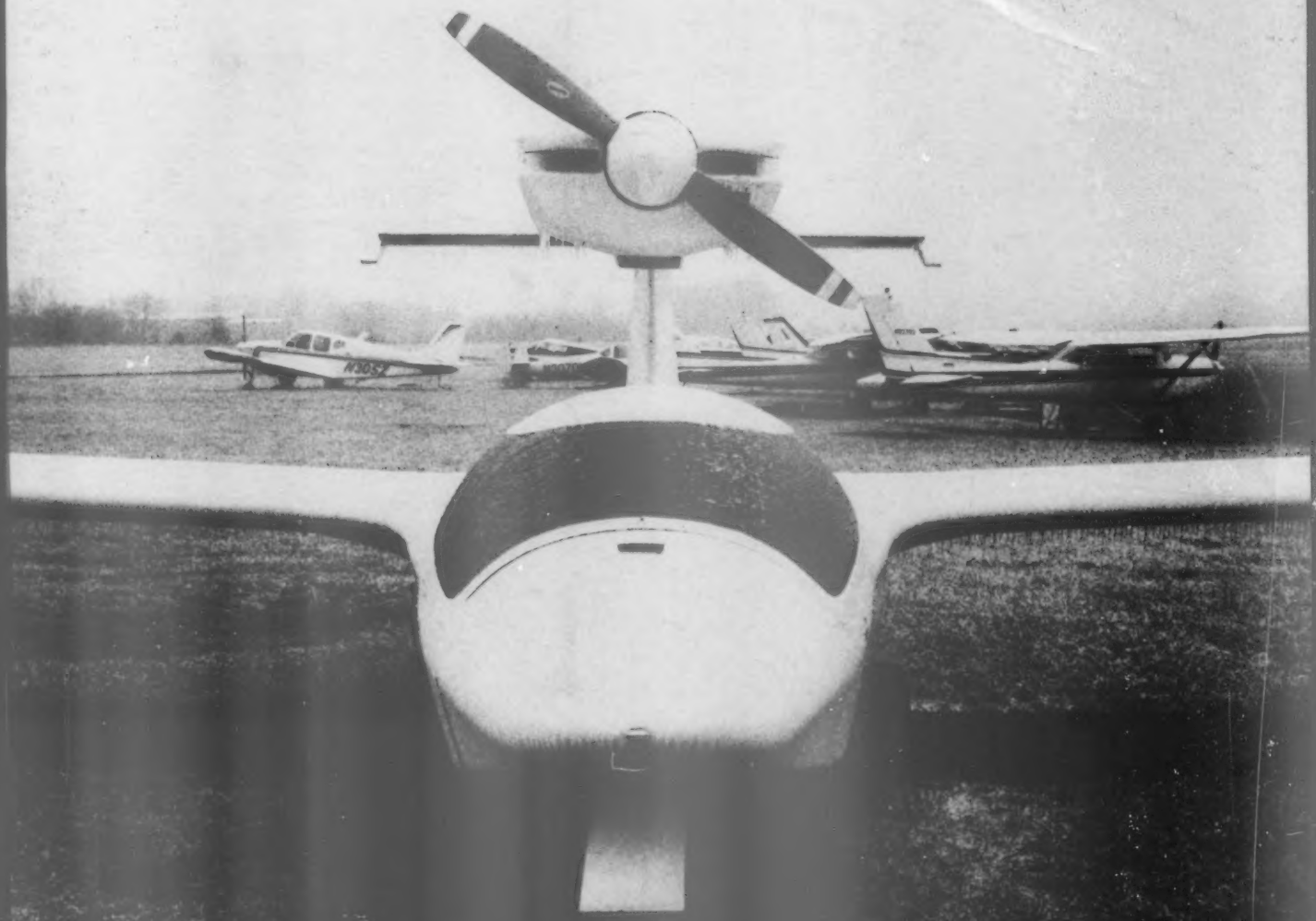
FROST-FREE AIRCRAFT

ALSO:

Snake Oil in the Cockpit, p.5 ■ The XYZ's of CZ's, p. 7
Famous Flyers—"Tiny" Broadwick, p.11
Survival Procedures for Non-Pilots, p.12



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BRIEFS

OPERATING HANDBOOKS. In 1975 FAA and the General Aviation Manufacturers Association first issued "Pilot Operating Handbooks" which offered a standard format for easy location of operational information for each make and model of aircraft. The handbook has now undergone its first revision—a reorganization of the emergency procedures to include "Abnormal Procedures," which contains a section covering systems malfunctions and unusual but not emergency situations. Other revisions include increased emphasis on challenge/response checklists, and operational data for optimum fuel efficiency. Copies of the new book for your aircraft may be purchased from GAMA, Pilot Operating Handbooks, 1400 K St., N.W., Washington, D.C., 20005, for $60.

ALERT STATUS. If you are thinking about easing the winter chill by flying your own plane to the Virgin Islands, take note of two new IFR military training routes between Isla de Calebra and St. Thomas. These routes (IR-026 and -027) were established to test unmanned flight vehicles escorted by tactical military aircraft. Their "hot" times can be obtained from the San Juan FSS.

BEAK FUTURE. Newly created manmade Lake Sonoma (near Healdsburg, CA) has been declared off limits to seaplanes because incomplete filling with water has created a possible debris hazard. Filling is expected to take at least two years, at which time the lake's builders—the Army Corps of Engineers--will reconsider the ban. Lake Sonoma's water shortage also makes it a critical habitat zone for the endangered peregrine falcon, whose territorial nature has led it to attack invading aircraft.

Pilots violating the ban face fines, confiscation of aircraft, imprisonment—or an angry bird's beak in the windshield.

SITTING SAFELY. As of January 1 many manufacturers of U.S. general aviation aircraft are installing shoulder harnesses as standard equipment on all forward-facing seats. Although not a regulatory requirement, this voluntary action by aircraft manufacturers is part of an FAA/industry drive to encourage use of the harnesses to reduce crash injuries. (FAR's do not require shoulder harnesses for passenger seats in general aviation.)

Frost-Free Aircraft — The 60% Solution

What to do when Jack Frost nips at your nose—and wings

***Question:** In the absence of visible precipitation, is it possible for an aircraft on the ground to acquire a coat of ice that would make takeoff dangerous?*

Yes it is. Aircraft surfaces, like bridges, give up heat much more rapidly than the earth or pavement, and may be heavily iced up on a morning when there is no sign of frost or ice on the ground. If there is enough humidity in the air and the temperature plummets during the night, aircraft parked outside could receive a coating of frozen dew or frost. Either form of icing can lead to takeoff accidents if not removed.

Frozen *dew* can take various forms depending upon the size of the dew droplets, the ambient temperature, and other factors. Sometimes dew freezes as deceptively clear smooth ice, hardly noticeable unless you are looking for it. Clear ice does not interfere with lift as much as some other types of icing, but it bonds very tightly to the surfaces and is relatively heavy. Because it is so easily overlooked, clear ice is notorious for causing imbalances and vibrations in delicately balanced control surfaces and on propellers and rotor blades, with serious consequences. If not removed before start-up, ice particles shed by spinning blades could have lethal force.

In very cold conditions supercooled dew droplets may freeze rapidly on aircraft skin in

Frost or frozen dew on the aircraft wing should alert pilot to look also in out of the way places—such as static port, venturi, or pitot tube—for ice that could hamper takeoff.

a form similar to rime ice—air trapped in the droplets gives this ice its characteristic milky white appearance. The irregular shape and rough surface of such frost make it very effective in reducing the aerodynamic efficiency of airfoils. Mixtures of frozen dew and frost, following a heavy dew, build up large chunks of ice that may enclose such protuberances as pitot tubes and antennas.

Frost forms much in the same way as dew, except that the water vapor in the air sublimates—passes directly from vapor to ice crystals. Thin metal surfaces, like the aircraft skin, are especially vulnerable to frost, which occurs most commonly when the air is clear and stable and winds are light or still—conditions which in other respects make winter flying highly enjoyable.

Frost is a thin coating which does not change the basic aerodynamic shape of the wing, but the roughness of its surface disturbs the smooth flow of air over the airfoil. A sandpaper-thin layer of rough frost has been shown, in laboratory tests, to destroy as much as 30% of lift capacity. A very small amount of frost in a key area, such as the leading edge of the wing, could prevent an airplane from becoming airborne at normal takeoff speed. If liftoff is accomplished the aircraft could have so little a margin of airspeed above stall that any maneuvering or turbulence could bring about loss of control.

Such accidents can happen anywhere within the frostbelt. A typical scenario might be a ski resort airport in a high mountain valley, with a pilot attempting an early Monday morning departure after a weekend of skiing in bright clear weather. Unless his preflight ice inspection was thorough, he might find his takeoff run requiring a longer than anticipated distance. After emerging from ground effect the pilot might experience difficulty keeping the airspeed up and the wings level. The takeoff might then have to be aborted, perhaps with substantial damage. The pilot's problems could be complicated by frost obscuration not previously removed from the windshield, and which cabin defogging heat was not able to clear.

Frost or frozen dew adherence to aircraft can be prevented effectively by hangaring it overnight. Once icing occurs, there are several means of removing it safely. On a warm day, the simplest and cheapest method is to park the plane in the sun and wait for solar energy to thaw the aircraft out.

If time is of the essence, the thawing process can be hastened by bringing the aircraft into a heated hangar, or by using an engine preheater which pumps hot air through flexible hose.

The quickest means of providing yourself with a clean aircraft for departure is to apply or obtain a de-icing/anti-icing treatment with a Freezing Point Depressant fluid (FPD). Very similar to automobile radiator antifreeze, an FPD fluid is essentially a mixture of water and some member of the glycol family of chemicals, such as ethylene glycol or propylene glycol, plus a corrosion inhibitor and a "wetting agent" for assuring an even residue coating.

(Aircraft can be de-iced simply by flushing the exterior with hot water until all visible ice is gone. However, this method is strongly discouraged, since some liquid residue, containing no freezing point depressant, could remain in hinge joints and other vulnerable mechanisms and freeze later at aititude.)

The freezing point of an FPD solution ranges from +20°F for mixtures containing 20% of glycol to as low as −80°F with a 60% solution. (Higher percentages of ethylene glycol only raise the freezing point.) The recommended mixture will leave the residue liquid, or anti-icing coating, with a freezing point at least 20°F below the ambient temperature—with allowances made for the diluting effect of ice melt.

Anti-icing "works" only as long as a visible liquid film is present, on the surfaces which can intermix with any snow or freezing liquid that it comes in contact with. It is quickly diluted by any form of liquid precipitation, and is not intended to provide any icing protection after takeoff or in clouds. The rapid airflow in flight will dissipate the film within a few minutes.

On the ground the duration and effectiveness of an FDP anti-icing coating are also difficult to predict or ascertain. Even in the absence of precipitation there are a variety of weather conditions which could change the effectiveness of the FPD. These include:

- Aircraft surface temperature
- Ambient temperature
- Anti-icing application procedure
- Ground fog
- Relative humidity
- Solar radiation
- Texture, contour, and inclination of aircraft surfaces
- Wind velocity and direction

De-icing/anti-icing services are available at many airports, and in most cases, the operators do a very professional job. However, the responsibility still rests with the pilot who is about to fly the airplane to make certain it is ready for flight. For example, it is standard practice to cover or seal over airframe openings such as pitot tubes and static ports before spraying the aircraft. (Liquid forcibly blown into these systems could result in distorted readings of instruments dependent on the pitot static system, such as airspeed and altimeter.) The pilot should personally inspect the aircraft before takeoff to make certain any such coverings have been removed.

The pilot or owner should also be aware of any manufacturer's recommendations regarding the protection of certain airframe materials from contact with glycol mixtures. Some forms of FPD's may cause "crazing" of windshields, or deterioration to plastic or rubber seals, or to special metals. Sensitive parts which cannot be protected from the spray may have to be wiped clean immediately afterwards.

Pilots should also inspect for completeness of the de-icing/anti-icing treatment, using a ladder when necessary to check the upper surface on a high-wing airplane, and taking the trouble to look underneath the fuselage and wing of low-wing aircraft.

Given the many variables of treatment with FPD fluids, the advantages of frost prevention by overnight hangaring are obvious, especially when an early morning departure is contemplated. The last thing you want to do is to try chipping off frost by hand. It is easy to damage the aircraft (or your hands) and very difficult to achieve a completely clean surface, once Jack Frost has laid a heavy hand on it. Better leave it to an expert.

Or wait. ■

Snake Oil in the Cockpit

Some Over-the-Counter Drugs are not Harmless Aloft

Every pilot knows that FAA regulations prohibit pilots from flying while under the influence of drugs or alcohol. However, some people feel this does not apply to over-the-counter medications. After all, if it is safe enough to sell in any drug store or supermarket without a prescription, it could hardly affect your flying—could it?

Yes, it could!

As with prescription drugs, over-the-counter medications can have side effects that, when combined with altitude and increased "G" forces, could interfere with the pilot's performance in the cockpit. Self-medication has been blamed for a number of serious and fatal accidents.

For exampie, recently a 27 year old pilot of a Piper *Cherokee* collided with powerlines near a rural landing strip during what appeared to be a routine approach. The pilot was familiar with the area and had landed at the strip many times before. The powerlines were well-marked and the ceiling and visibility were unlimited. No reason for the crash was apparent until the coroner's report disclosed that barbituates were present in the pilot's system. Further investigation showed that he had been trying to lose weight. Investigators theorized that after taking the drug the pilot had felt very alert and ready for anything. After the initial euphoria wore off, other side effects could have been expected, notably drowsiness and inattentiveness. No reason, other than lack of alertness, could be found which might have caused him to fly into the powerlines. The pilot and his passenger both received fatal injuries.

Over-the-counter drugs containing relaxants or depressants carry cautions about "driving or operating heavy machinery." Airplanes are not specifically mentioned, but

they should be. Pilots should read all labels scrupulously. Drugs which have few noticeable side effects on the ground can be very troublesome aloft.

For example, the use of an antihistamine for a respiratory problem may help clear up the symptoms quickly. But if the pilot decides to fly while still recuperating and while still on medication, or even shortly afterwards, he could experience reduced mental ability, nausea, dizziness, headaches, etc. For most drugs the suggested waiting period before flying after final dosage is 24 hours.

Pilots should be especially attentive to the contents of medications in liquid form: many contain alcohol. *Why alcohol?* It is a better solvent than water for some chemical mixtures. The mixture will keep almost indefinitely, whereas water-based mixtures tend to separate after a while.

According to an article in the November 1984 *FDA Consumer* these elixirs (whatever contains alcohol can be called an "elixir") may be as much as 44% alcohol. The contents and uses of such elixirs are now strictly controlled, and the disclosure of their contents is mandatory; but until shortly after the turn of the century this was not the case. Some time-honored remedies had been used in families for generations without anyone realizing that the main active ingredients were alcohol or narcotics.

Beginning in 1906, the Food and Drugs Act required that all ingredients in a medication be indicated on its label with percentages and weights listed so anyone could tell at a glance what the bottle contains.

Today, any elixir intended for the over-the-counter market must be sent to the Bureau of Alcohol, Tobacco, and Firearms for testing. If it contains more than 20% alcohol, the Bureau may ask for a sample for further analysis. If it appears to be more of a beverage than a medicine, it will be rejected. The alcohol used in elixirs, by the way, is 190 to 200 proof.

Another factor a pilot should consider is the consequence of taking several "harmless" medications at the same time. In some cases one drug might nullify or increase the effectiveness of one or the other. Or it might cause possible side effects which neither medication alone would cause. Even eating certain foods in combination with some medicines can sometimes produce a dangerous reaction. The safest rule is to take *no* medicines before flying without consulting a physician—preferably an AME. He or she may be able to eliminate the danger by simply substituting one effective remedy for another.

The simple truth is that a need for medicines of any kind is an indication of being unwell. And since flying is an activity which can make peak demands on a pilot's performance at any moment, it is courting danger to fly when one's health is below par for any reason—just as it is to fly with a "slightly" rough-running engine. ■

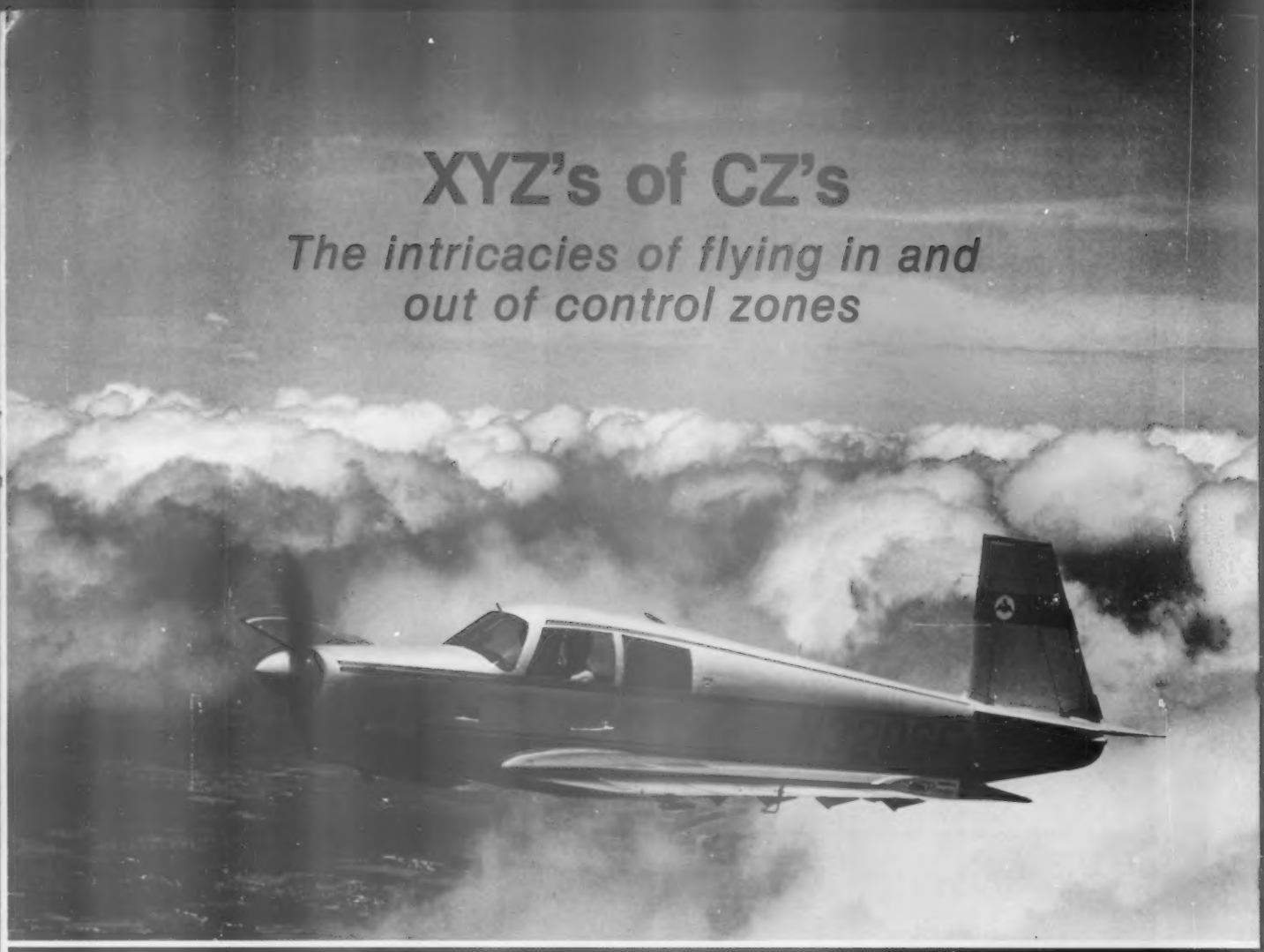
ALCOHOL CONTENT

Partial List of Common Drugs Which Interfere with Flying Ability

Over the Counter Drugs	Possible Side Effects	Hours to Wait Before Flying
Anti-motion Sickness	Drowsiness, dizziness	24
Cold Medications		
Antihistamines	Severe drowsiness, dizziness	24
Cough suppressants	Same as antihistamines	24
Gargles & mouthwashes	No ill-effects	—
Nasal sprays	Excess amounts may cause pallor, nervousness, trembling	—
Digestive System Drugs		
Antacids	No effects except for biocarbonates which produce gas in stomach and intestine	—
Anti-diarrhea drugs	Some may cause drowsiness, slowing of reactions	12
Laxatives	May cause diarrhea	12
Pain Killers		
Salicylates (aspirin, etc)	No ill-effects in normal low dosage, excessive dosage may cause nausea, stomach irritation, vertigo	—
Sedatives		
Containing Alcohol	Causes apparent stimulation through impairment of high judgement centers	time varies with drink/weight ratio, but no less than 8 hours
Sleeping pills	Sleepiness, impairment of consciousness and judgement	24
Stimulants		
Appetite-suppressant pills	Wakefulness, nervousness, impaired judgement and fatigue	24
Caffeine (Coffee, tea)	No ill-effects, excessive amount causes nervousness, wakefulness	6 if excessive
Stimulants	Wakefulness, nervousness, impaired judgement, fatigue	24
Vitamins	No ill-effects, excessive dosage should not be taken	—

XYZ's of CZ's

The intricacies of flying in and out of control zones



One of the forms of quiet excitement that pilots enjoy is planning a flight over unfamiliar ground, visualizing various terrain features, NAVAID's etc., from the symbols present on the charts. For the VFR-only pilot, however, there is one symbolic representation—the control zone—that causes some confusion, so much so that occasionally pilots will dogleg around the dashed-line perimeter of the zone rather than risk breaking a rule or endangering their safety.

This is quite unnecessary. For purposes of VFR non-aerobatic flight the control zone has no significance, except to remind one that IFR traffic, possibly air carrier, may be operating in the vicinity, and ATC traffic advisories might be sought. A control zone is simply a circular column of airspace which, *in instrument meteorological conditions*, is reserved exclusively for the use of traffic operating between airports and airways on an IFR flight plan, or on a special VFR clearance. The airspace is usually 10 miles in diameter, with some variable extensions, rising from the surface up to 14,500' MSL. It is in continuous existence, unless otherwise noted on sectional charts and in the *Airport/Facility Directory*. The governing authority is approach/departure control, when there is a functioning tower, or the appropriate air traffic control center. No one is allowed to perform aerobatics in a control zone. Otherwise, as noted above, the zone demarcation can be virtually ignored by pilots as long as VFR weather minimums for controlled airspace can be maintained. (Exception—ultralight operators need prior authorization to operate in a control zone.)

It is only when the weather becomes marginal that the VFR pilot must be concerned about control zone penetration. If he or she is in transit only, the pilot can proceed without contacting ATC as long as it is possible to maintain basic VFR weather minimums (FAR § 91.105) for flight in controlled airspace: 3 miles visibility; cloud clearance—500' below 1,000' above, 2,000' horizontally. (Of course, when flying below 3,000' AGL and within five miles of an airport with an operating control tower—i.e., an airport traffic area—radio contact must be made with that tower.) If any of the weather minimums are less than required, VFR aircraft cannot enter the zone without an appropriate clearance from ATC.

If a VFR pilot wishes to land at or depart from an airport which lies within a control zone, the same VFR visibility and cloud clearance minimums apply, plus a distance of at least 1,000' between the surface and any existing cloud ceiling. The ceiling is always determined by the certified weather observer for the control zone, and applies to all airports located within the zone. If current weather observations are not available for the airport of intended use, the pilot may be governed by his own observations of flight visibility(and ceiling when there is no official ceiling reported for the zone).

When the weather is less than VFR, but affords not less than one mile visibility, pilots may request a "Special VFR clearance" from the facility governing the control zone. (Certain busy airports, identified on sectionals by "T" marks within the segmented perimeter, do not allow Special VFR.) Controller workload permitting, Special VFR will be granted whenever it will not delay existing IFR traffic. (You must meet

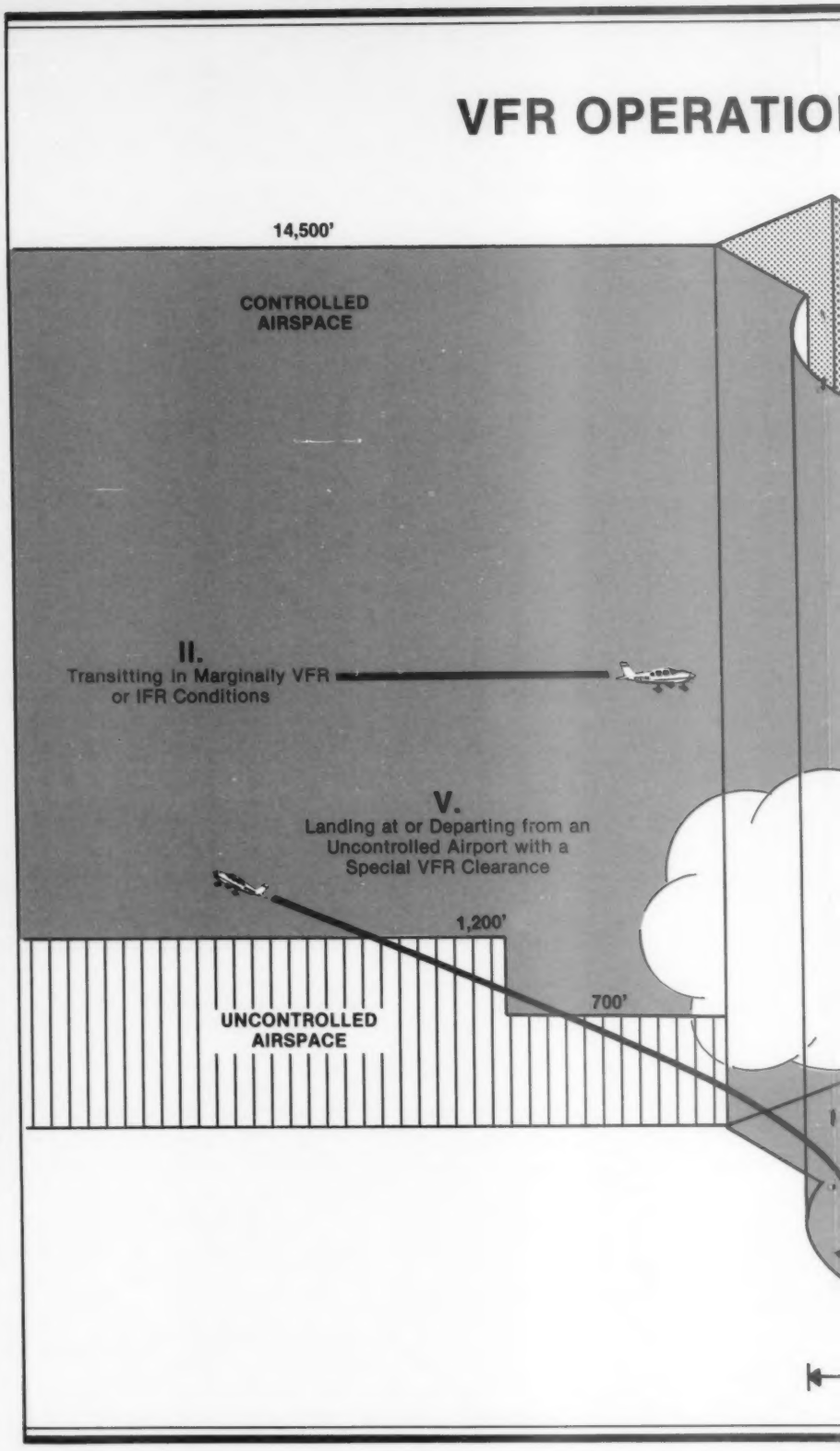
Situation I
No contact with ATC required. Anticipate possible IFR and air carrier traffic. Departure control or center may provide traffic advisories on request.

Situation II
A "Special VFR" clearance must be obtained from air traffic control. Pilot must be able to remain clear of clouds at all times and proceed as directed by ATC. Clearance not available at night except to qualified IFR pilots.

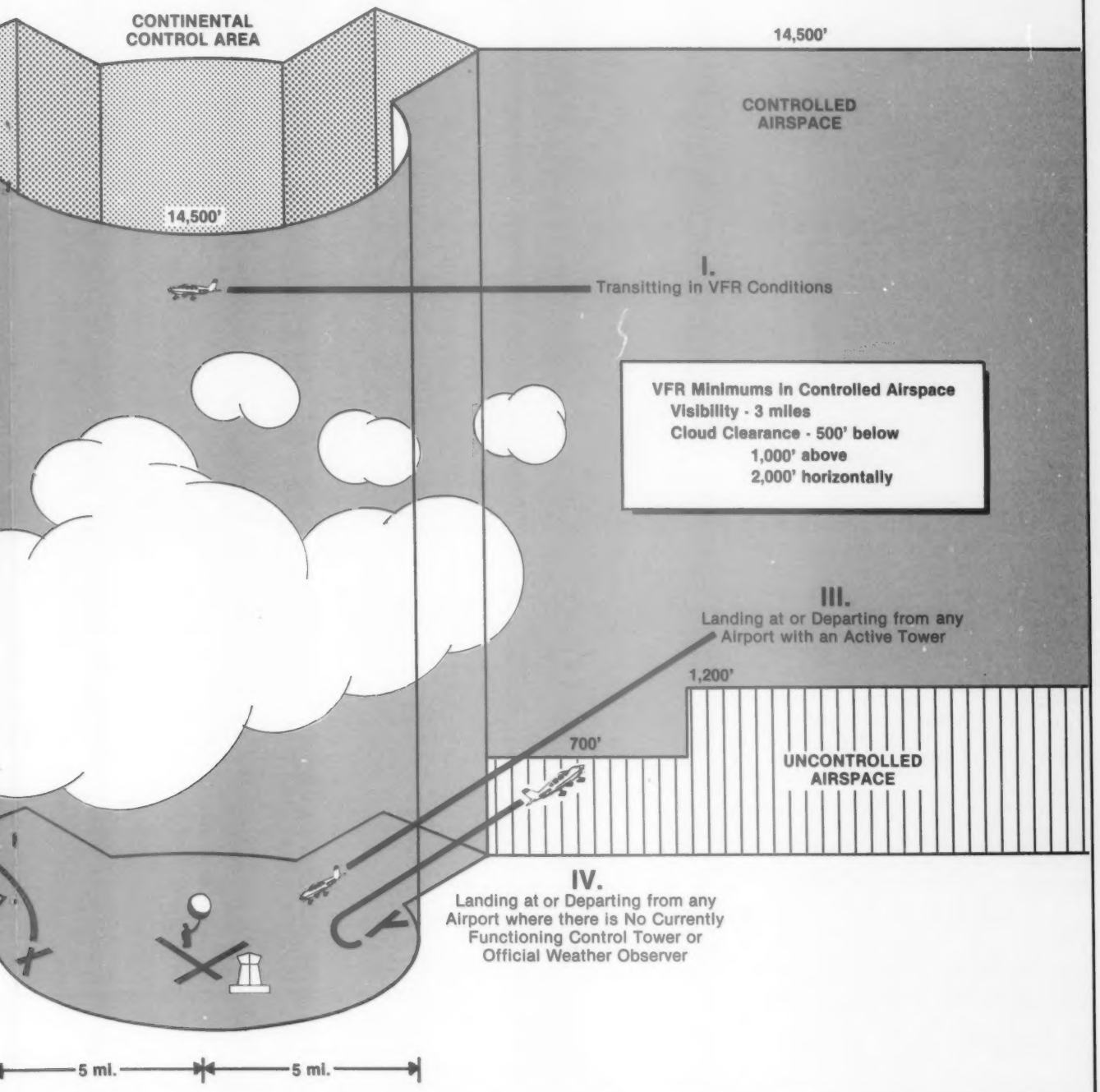
Situation III
In VFR conditions, contact control tower in normal manner prior to operating in airport traffic area. Note that cloud ceiling altitude as determined by official observer applies to all airports in the control zone. At airports where there is no official weather observer, pilot may determine flight visibility for himself. In less than VFR conditions you must obtain a Special VFR clearance before operating in the zone. See Situation II.

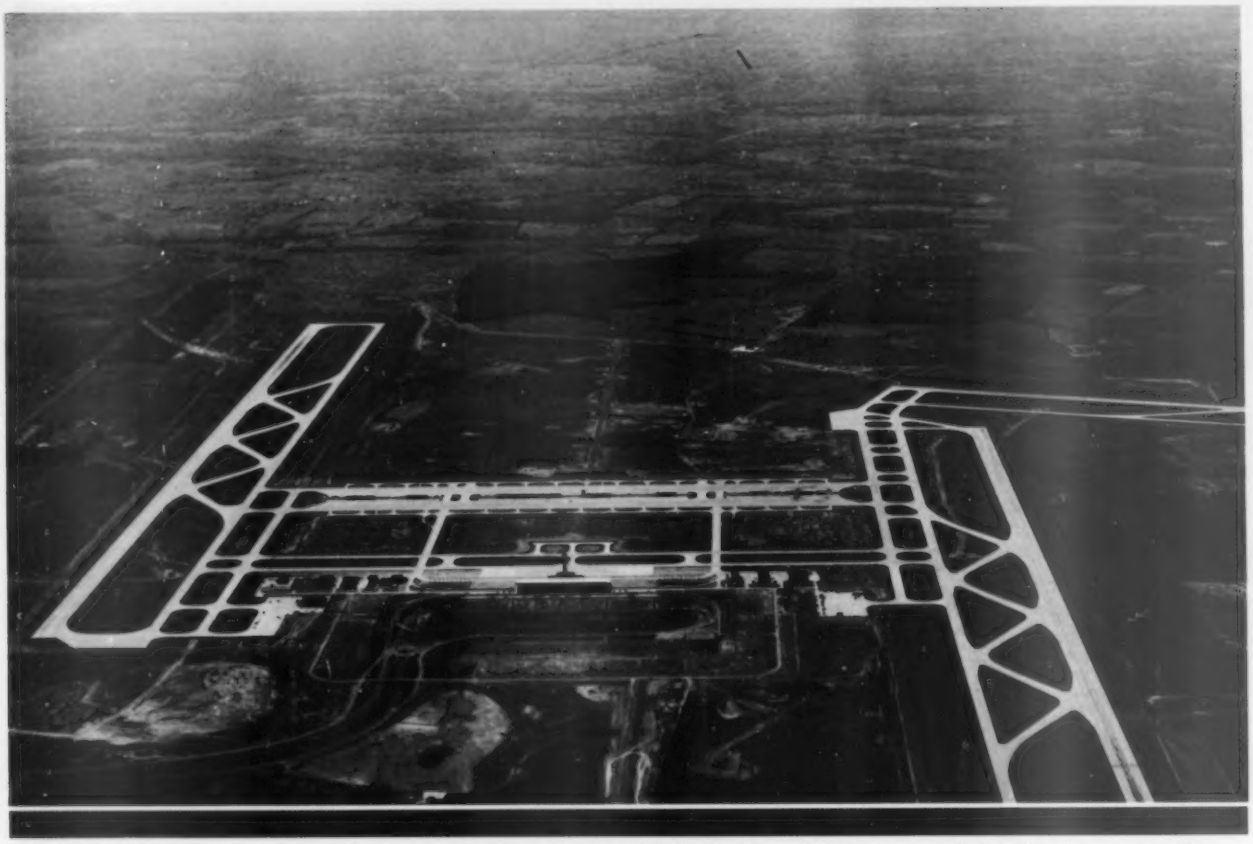
Situation IV
Pilots may determine whether ceiling is at least 1,000' and flight visibility three miles or better.

Situation V
Obtain clearance from air traffic control before operating. See Situation II.



ONS WITHIN A CONTROL ZONE





Unlimited ceilings over the primary airport of a control zone may not hold true for secondary airports located in the countryside.

applicable requirements for instrument flight and the aircraft must be equipped for instrument flight for a Special VFR clearance at night.) Pilots will be provided separation from IFR traffic in the zone and given vectors or instructed to make position reports.

Note that a Special VFR flight does not authorize you to fly in clouds, regardless of whether you are instrument rated and qualified. Its essential purpose is to allow pilots to fly through a local area of sub-VFR conditions when concluding or initiating a VFR flight, thus avoiding a lengthy delay on the ground or a long detour. It should not be undertaken lightly by pilots who have little instrument experience or who have never flown without reference to the ground.

The holes in the clouds which pilots intend to fly through sometimes close up abruptly, requiring complete dependence on instruments and ATC vectors. In these circumstances even instrument-rated pilots have occasionally become lost, disoriented, and have crashed. A Special VFR departure for the purpose of continuing VFR-on-top temporarily sometimes has a way of turning into a long flight over a heavy cloud deck, with eventual fuel shortage–or perhaps malfunction–forcing a descent through or into clouds. In winter, icing may worsen the situation.

Accidents occurring to pilots who have been issued a Special VFR clearance are not numerous, averaging about six or seven a year, but most of them are fatal. Some examples follow.

• **Deadhorse, AK; Oct. 19, 1980; 9:05 p.m.** A Cessna 206 with two on board. Ceiling 500′, obscured, visibility 5 miles in light freezing drizzle and fog. Pilot requested Special VFR clearance to land at Deadhorse and received it. In an apparent attempt to remain clear of clouds, the pilot made an early descent close to the ground. Three miles out from the runway the aircraft struck an oil pipeline support brace 45′ above the surface, crashed and burned.

• **Roanoke, VA; Oct. 20, 1980; 8:10 p.m.** A Cessna 172A with four on board. Ceiling 1,000′ broken with visibility two miles in fog and rain. After takeoff the weather appeared too bad for the intended trip to Smith Mountain Lake. The pilot turned back toward Roanoke and requested landing instructions. He was told Roanoke was IFR; he then asked for and received a Special VFR clearance. During the approach to land, the aircraft struck a wooded area of a ridge about four miles from the airport, which is surrounded by hills. Witnesses near the accident site reported ceilings of only 200-300′, fog, and light rain. Apparently the pilot did not anticipate the difficulties of approaching safely under a low ceiling over elevated terrain. Fatal to four.

• **Near Redlands, CA; Aug. 13, 1979; 11:04 a.m.** A Piper PA-30 with two on board. Departed Flagstaff, AZ for Norton AFB, CA. A 10:22 a.m. Norton weather report indicated sky partially obscured with 600′ overcast, 1.5 miles visibility in fog. Pilot was on an IFR flight plan conducting an ILS approach to Norton when he indicated he could see the ground, cancelled IFR, and requested Special VFR to Redlands, which was granted. Witnesses reported seeing the aircraft disappear into clouds and hearing the engine speed up, followed by an impact sound. The aircraft was found three miles east of Redlands at the 3,000′ level of a mountain. Fatal to both.

• **Redondo Beach, CA; Feb. 11, 1979; 12:15 p.m.** A Cessna 152 with two on board departed Special VFR from Hawthorne, CA for a local coastal pleasure flight. Hawthorne weather was given as sky obscured, visibility 1.5 miles in fog and haze. While about 10 miles out from the airport over the ocean, visibility deteriorated to 1/4 mile, and the pilot attempted a descending left turn back to Hawthorne. The left wingtip contacted the water, and the Cessna crashed 50 yards offshore from Redondo Beach. Passenger received minor injuries. Pilot was trapped in aircraft underwater and had to be resuscitated when freed. ■

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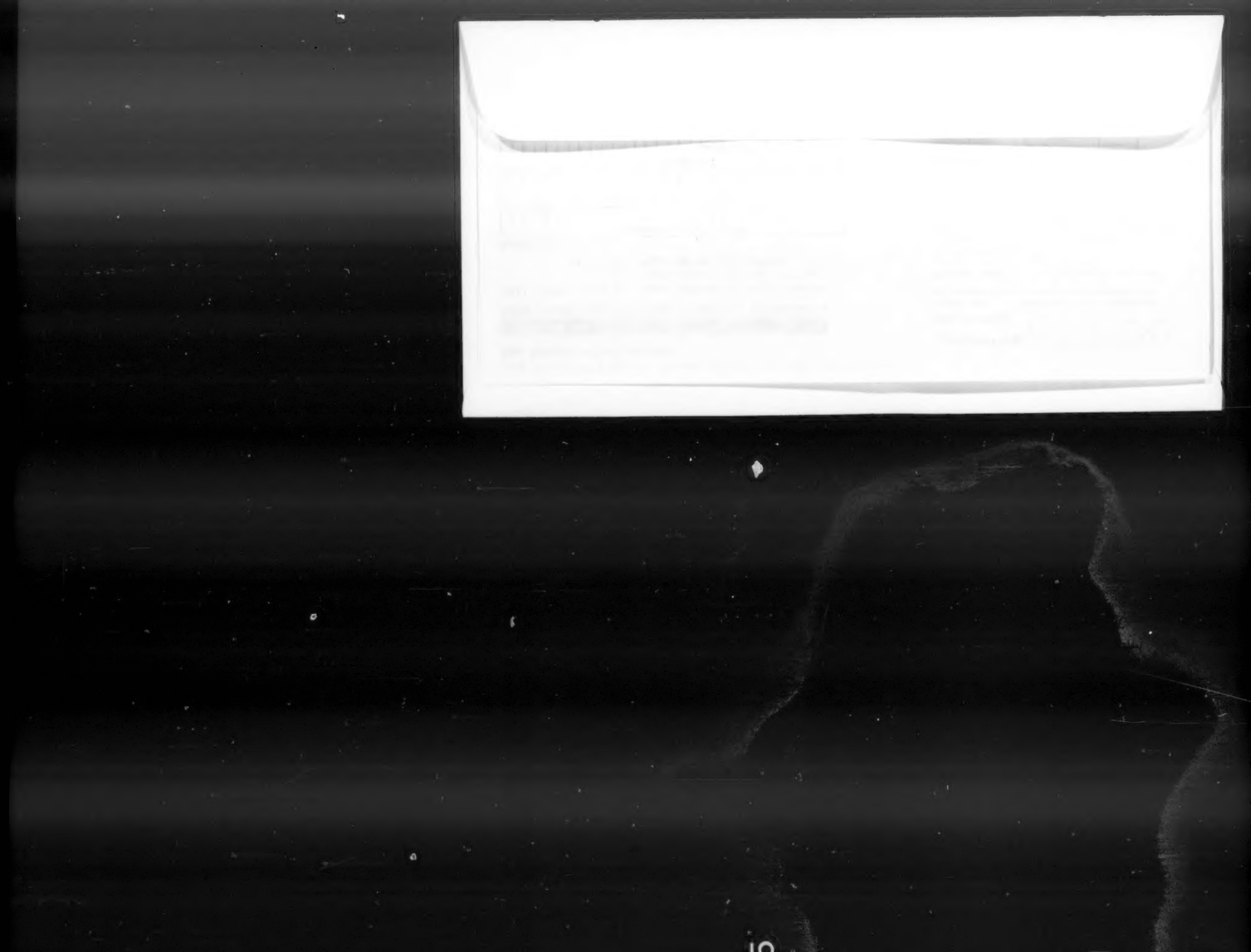


"Tiny" Broadwick and her Life Preserver of the Air

It was love at first sight. One glimpse of the gracefully ascending balloon and this small slip of a girl was enchanted with the idea of spending her life among the clouds. She remained at the launch site until the crew returned and begged for a chance to join their ranks. The master balloonist, Charles Broadwick, who was used to dealing with runaway children, patted her on the head and told her to run along home, as her mother was probably looking for her.

He was indignantly informed that he was dealing with no child, but with a young lady by the name of Georgia Thompson. Though only 15, she had already been married and widowed. Born in 1893 to a poor farm family in Henderson, NC, she had supported herself since age 12 by working in the cotton mills, and despite the fact that she was scarcely five feet tall and weighed only 90 lbs, she was not afraid to tackle anything. She was "spellbound and hellbent to get into the act."

Broadwick decided to take her on. A veteran balloonist and parachutist whose family had been leaping out of airborne gondolas for generations, he was also a master showman who knew his business. Ballooning in 1908 was mostly carnival entertainment, with the balloon gondola used primarily as an elevated platform for ever more dazzling and daring high wire trapeze acts, while the "flyer" on the trapeze—which was attached to a parachute—was being wafted, or in some cases, whirled earthward. The name of the game was to continuously find some new means of thrilling the crowds at fairs and other outdoor gatherings.

In contrast to the professional aerialists, who were capable of clinging to the trapeze with their teeth or their toes, why not present an innocent, doll-like creature flung out of the balloon gondola? For her role as waif-heroine, Georgia was given a new surname of renown ballooning lineage (her employer's). As "Tiny" Broadwick, the Doll Girl, she was dressed in a baby's bonnet and ruffled gown with pink bows, given a few hours of basic training, and sent aloft to begin her new career. The pay was an astounding $250 a week (less room and board, travel and medical costs) for six jumps.

The Doll Girl was an instant success, and the Tiny Broadwick act was soon in great demand all over the nation. In the course of learning the trade Tiny suffered some hard falls and broke some bones, but she took her lumps in stride and eventually acquired an authoritative feel for parachuting that enabled her to survive an average of over 100 jumps a year for six years.

Initially the parachute was loosely folded in a bag in the balloon gondola, drawn out by the weight of the chutist on the trapeze, and unfolded by the wind. The moment of suspense while this took place—or did not, on some unhappy occasions—was part of the act's appeal. In 1912 the ever resourceful Charles Broadwick decided to add to the excitement by concealing the chute, closely folded, in a small bag under a sort of coat on the back of the chutist, who would be attached to it by means of a harness (also concealed under clothing). No trapeze, no trailing lines, just a body going over the gondola side, attached to a release cord which, pulled by the falling chutist,opened the bag and started (hopefully) the deployment of the parachute.

Eventually Tiny built a new and even more successful act around the "invisible" chute,

(continued on back cover)

Tiny, wearing coatpack, prepares for parachute jump from Glenn L. Martin's biplane. The photograph was taken in 1913.

SURVIVAL PROCEDURES FOR NON-PILOTS

En route from Taos, NM to Aspen, CO the pilot of a Cessna 180 encountered a vicious snow storm. He was able to climb out on top of the clouds at 16,500′, but shortly afterwards, near Gunniston, CO, his engine began to run rough and eventually stopped. Descending through the clouds with near zero visibility, the airplane impacted a clump of pines at the 10,000′ level. The 180 remained suspended in the trees about 30 feet above the ground, but the pilot, who was not seriously injured, pieced together three lengths of tie-down rope he had stowed under a seat and let himself down onto the snow—after first tossing out all the survival gear and other useful items the aircraft cabin contained.

The crash occurred at the height of the snowstorm, on a desolate slope of the upper Rocky Mountains, and the ELT failed to function because the antenna had been dislodged during impact. The temperature was well below freezing and would soon drop below zero F. Daylight was fading rapidly.

Nevertheless, the pilot, who was experienced in mountain flying, was able to construct a serviceable shelter in which he spent the night with no great discomfort. The next day, following sound principles of winter crash survival (see November/December 1983 FAA GENERAL AVIATION NEWS, "At Home in the Snow.") he was able to participate in his prompt rescue and return to safety.

Consider how differently this narrative (taken from an actual accident report in the files of the National Transportation Safety Board) might have ended if the pilot had been injured to the point of incapacitation during the crash, and had been accompanied by a passenger without knowledge of mountain survival procedures.

General aviation pilots who operate under the basic operating rules of FAR § 91 are required only to brief passengers on how to fasten and unfasten the seatbelts and to ensure that they are donned by all on board for takeoff and landing (FAR § 91.14). Additionally, passengers on board large and turbine-powered multi-engine airplanes operated under Subpart D of Part 91 must be briefed on not smoking during takeoff and landing, the use of the seatbelts, the location and means for opening the entry door and/or emergency exits, the location of survival equipment, use of flotation equipment, and the use of oxygen. Primarily operated by businesses and corporations, these aircraft are fairly complex, usually pressurized, and have several doors and emergency exits. Other general aviation aircraft are not required to have an emergency exit, unless they seat six or more, and may have only one door.

So if we, as pilots, crawl in our little single-engine aircraft and just tell our passengers: Listen! Here's how we fasten our seatbelts and you must wear them when we take off and land—have we fulfilled the requirements of the regulations? As far as the *letter* of the law is concerned, perhaps, yes, but what about another rule which says that "The pilot-in-command of an aircraft is directly responsible for and is the final authority to the operation of that aircraft." (FAR § 91.3)? In civil suits filed by injured survivors and their beneficiaries, judges and juries have interpreted "directly responsible" to include responsibility for emergency survival of passengers carried in that aircraft (FAA GENERAL AVIATION NEWS July/August 1981, "Due Care").

Whether for an airline or general aviation passenger, a briefing on emergency procedures is important. During an inflight crisis,

the pilot may be too busy coping with the problem to give instructions. If the pilot is incapacitated in a forced landing, it is important to assure that passengers know what to do and how to do it. Besides understanding about the importance of a speedy evacuation and how to accomplish it, there are other aspects of surviving a forced landing that a general aviation passenger—especially a first-time or infrequent small aircraft passenger—needs to know: how the ELT works, where any survival gear or flotation equipment is stored, how to provide protection against the weather, etc. Lives have been lost that might have been saved had the passenger known what to do without the help of an incapacitated pilot.

Exactly why most general aviation pilots omit a formal or informal safety briefing for their passengers is not really known. Possibly, the pilot psychologically does not want to accept the fact that in every flight there is the possibility of a disabling emergency. Or there may be concern that such a discussion will make the passengers nervous and unable to enjoy the flight.

Some pilots who find it awkward to talk to passengers about emergency procedures write up the information they think will be needed on a sturdy card, which is laminated and fastened to the rear of a seatback. Cards are ideal because passengers can read them at their own pace and thus are more likely to retain the vital information. Cards which are easily accessible and readable provide a quick, in-flight review during the development of an inflight emergency.

Ideally, such a card would include a section on what to do inflight, during preparation to land, and after landing. It should describe how to open the main door (different aircraft have different latching systems, some with more than one latch per door); point out the location and opening of emergency exits (if any); and explain what to do if the only exit is jammed or blocked.

When conveying information in this manner, simplicity and brevity are important. When possible, illustrations or diagrams are very helpful. A small paperback survival manual clipped to the seatback could be a lifesaver.

If you fly several different kinds of rental aircraft, with passengers, you might want to make up a "generic" card, with room for varying exit instructions. Exit data is particularly important for aircraft with only one door, which could be jammed or blocked in a forced landing.

Below is a sample general aviation passenger "briefing card," complete with blanks so that it can be customized for individual aircraft. If it suits your needs, feel free to use it, or duplicate it. Each pilot would have to determine whether it is suitable for the aircraft he or she normally flies.

With a simple aid like this in your aircraft, you will be able to concentrate on flying the airplane during any inflight emergency. That alone might well improve your own chances of walking away from every landing "without a scratch." ■

EMERGENCY INSTRUCTIONS FOR PASSENGERS

INFLIGHT

- Stow or secure sharp, hard objects under the seat
- Fasten seat belt and shoulder harness if available
- Follow pilot's instructions but avoid interference

BEFORE LANDING

- Protect face with crossed arms, bundled clothing, or extra seat cushion

AFTER LANDING

- EXIT IMMEDIATELY (assist others if possible) via cabin door located at _____

  _____

  OPENING INSTRUCTIONS: _____

  _____

  ADDITIONAL DOORS located at _____

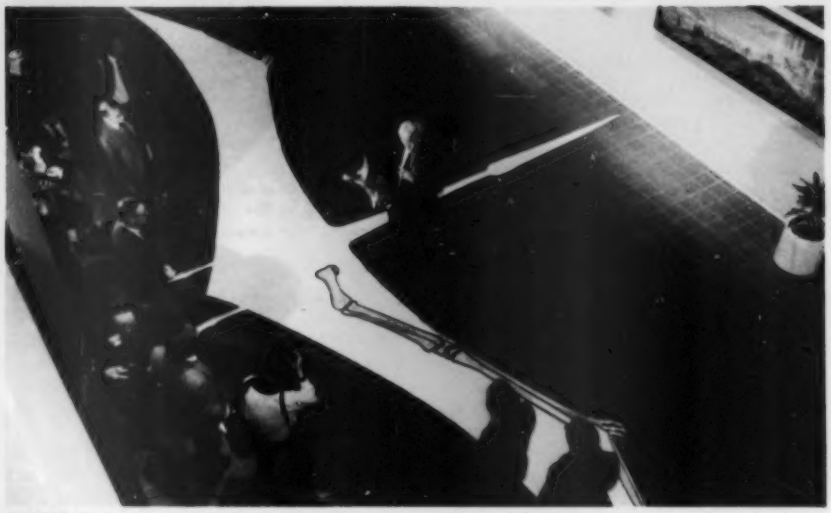
  EMERGENCY EXIT(S) located at _____

  _____

IF EXIT(S) JAMMED OR BLOCKED, BRACE YOUR BACK AGAINST SOMETHING SOLID AND KICK WINDOW(S) OR BAGGAGE COMPARTMENT OUTWARD.

- REMAIN CLEAR of aircraft until you are certain there is no danger of fire, then return to it for shelter.
- EMERGENCY LOCATOR TRANSMITTER should transmit automatically on impact and in most cases will summon assistance shortly. To assist rescue, make certain crash site is conspicuous, and be alert for overflying aircraft.
- FIRST AID KIT is located _____
- SURVIVAL GEAR and water are located _____
  (Use enclosed materials for SOS signalling, fire building, bedding, building, chopping, etc.)
- FLOTATION DEVICES(S) located _____

IMPORTANT: AFTER INITIAL EVACUATION, STAY IN OR NEAR THE AIRCRAFT. IT IS THE FOCAL POINT OF ANY SEARCH AND MAY BE YOUR BEST SHELTER. IF YOU SEEK AID ON FOOT, LEAVE A NOTE.



BIG BIRD. The Smithsonian Institution in Washington, D.C. is sponsoring construction of an operational, full-sized replica of the largest animal ever to fly. The battery-powered, radio-controlled model of *Quetzalcoatlus northropi* will duplicate the flight of a pterosaur which became extinct 65 million years ago.

VFR "FLYWAYS" SHOWN ON NEW TERMINAL AREA CHARTS

VFR pilots who are looking for the most efficient means—with the least amount of trouble—to fly through or around Terminal Control Areas will be interested in a new planning chart being issued by the FAA. Suggested VFR flyways and altitudes are now being depicted on the reverse side of VFR Terminal Area Charts, which are detailed maps of terminal control areas.

FAA Administrator Donald Engen believes the flyways will offer VFR pilots a useful aid for flights through or around heavily trafficked controlled airspace. To date four of the 24 TCA charts have the flyways pictured: Los Angeles, San Diego, Dallas-Ft. Worth, and Houston.

The charts will be changed to include the flyways at a rate of four per year, with the additions made on their regular expiration date. Miami is scheduled for early this year, followed by Washington, Las Vegas, San Francisco, and Atlanta.

The Flyway Charts show the same geographical area as the TCA charts but without most of the terrain features. Obvious landmarks are illustrated to aid in flight planning and orientation. The flyways themselves and their directions are depicted by wide blue arrows with the recommended VFR altitude range indicated. As much as possible the flyways—whose use is *not mandatory*—will be direct routes between regularly travelled areas.

VFR Terminal Area Charts may be purchased at airports from a fixed base operator, from chart services, or from NOAA Distribution Branch, N/CG33, National Ocean Service, Riverdale, MD 20737. Check price before ordering by telephoning (301) 436-6990.

SPACE VEHICLE LAUNCH SITES

Since 1965 private aircraft have been excluded by regulation (FAR § 91.102) from airspace surrounding a space vehicle launch recovery area unless they had ATC or Department of Defense authorization. However, several incidents of "sightseeing" in the vicinity of Cape Canaveral, before space shuttle launches, has prompted FAA to amend its rule to include prohibition *during* launch and flight.

Launch officials have been concerned that unauthorized aircraft could interfere with an emergency return by the shuttle or other launched vehicle. For a depiction of the restricted airspace around Cape Canaveral, check the appropriate aeronautical charts and NOTAM's at the nearest flight service station.

LATEST AIRMAN PUBLICATIONS

Bird Strikes

Operators of jets, including general aviation turbine aircraft, will be interested in a recently issued special report, "A Study of Bird Ingestions into Large High Bypass Ratio Turbine Aircraft Engines." The 150-page study may be ordered through the National Technical Information Service, Springfield, VA 22161. Check price before ordering: (703) 487-4650.

Anti-Misfueling Devices

Aircraft owners needing some guidance for buying and installing the new filler port or fuel nozzle kits to help prevent misfueling accidents may want to consult AC 20-122, "Anti-Misfueling Devices: Their Availability and Use." Free from DOT Publications Branch, M-494.3, Washington, D.C. 20590.

Ag Autogas

Acceptable conditions under which automobile gasoline may be used in some restricted category agricultural aircraft are outlined in "Use of Automobile Gasoline in Agricultural Aircraft," AC 21-21. (Only agplanes powered by Pratt and Whitney R-985 and R-1340 radial engines may use autogas.) Free from M-494.3, address above.

Air Taxi and DER Lists

Lists of certificated air taxi operators and individuals approved as Designated Engineering Representatives can be obtained from AC 135-11A ("Air Taxi Operators") and AC 183.29-1S (Designated Engineering Representatives), respectively. These lists, which are alphabetized by state and provide addresses, may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402. Check with GPO for the current price before ordering.

FASTEST THING ON WINGS. Although it has been flying for over 20 years, the Lockheed SR-71, called "The Blackbird" for its distinctive color and radar resistant profile, is still the world's fastest jet, with a cruise speed of Mach 3 (2300 mph). Photographs depicting the future of flying are on display at the Franklin Institute's Aviation Hall, Philadelphia.

• Where the Berms Dwell

I enjoyed your article on "Winter Flying" in the November/December 1984 issue. I'd like to add a few pointers from my experience flying out west in cold weather.

You listed the dangers of winter flying quite well, but what about the danger of damage to aircraft gear systems—both nosewheel and main gear—by the practice of partially plowing runways. Snowfall that is plowed to one side can melt a little then refreeze, forming small berms the length of the runway or on the taxiway. This can result in loss of control if one is struck during a high-speed taxi or during takeoff. The berms can appear like soft fluffy snow but can be solid frozen ice underneath—and that can spoil your whole day.

Dale C. Ruoff
Woodbridge, VA

A good point to make. Perhaps a check of conditions before takeoff—either by talking to airport personnel or by making a visual inspection—is in order at airports where runways and taxiways have been plowed. Also, slow taxiing to minimize the jarring to your gear is recommended, as is keeping a rolling airplane on the runway centerline (away from the edges where berms dwell) during takeoff.

• Marking Proportions

In your article "Aircraft Markings" (November/December 1984) you detail the size and location of the markings, but what about proportions—width, thickness, spacing, etc.?

Megan Marcey
Falls Church, VA

The proportions (which can also be found in FAR § 45) of letters and numbers are as follows:

Width	⅔ as wide as high
Thickness	⅙ as wide as high
Spacing	¼ the character's width
Uniformity	Same size for both letters and numbers

Example, letters 12 inches high will be 8 inches wide, and the lines forming the characters will be 2 inches thick with ½-inch space between characters.

• Administration or Agency?

Is there any basis for reading the initials "FAA" as standing for "Federal Aviation Agency?" I had always thought, until recently when I found evidence to the contrary, that reading the second "A" as "Agency" was a popular misconception that one from time to time encountered in the press.

Earlier this week I visited the Flight Service Station in Ontario, CA. On the FAA building in large, metal letters was the sign "Federal Aviation Agency."

I am puzzled. Is that a mistake?

Newton Miller
Redlands, CA

No, just an anachronism. After the Federal Aviation Agency became the Federal Aviation Administration (of the Department of Transportation) in 1967, most, but apparently not all, of the building signs were updated.

• Military Flight Training

I was enrolled in Naval Aviation training and went through ground school plus 160 hours in complex military aircraft, turbo-prop and jet. The requirements and standards were much higher than those for civilian pilots. After I disenrolled (for family hardship reasons), I've had trouble finding an instructor who will accept my background as sufficient for giving me a private pilot certificate—they indicate I don't have enough ground school. I thought the FAR's recognized military aviation training?

Luis R. Quinonez
Springfield, VA

FAA issues special pilot certificates and/or ratings to those who have *completed* pilot training in the military. Partial military pilot training, however, may not cover all areas appropriate for civilian pilot training.

Your military flight time may be used in meeting aeronautical experience requirements, but you will have to meet all the other appropriate written and flight test requirements for at least a private pilot certificate before one can be issued to you.

• Funnelling Airport Traffic

I have noticed over a period of time that any FAA references to entry to a traffic pattern at uncontrolled airports are limited to the 45° entry onto the downwind. This is stated in The Flight Training Handbook *and AC 90-66* (Recommended Standard Traffic Patterns for Airplane Operations at Uncontrolled Airports) *as well as in the* Airman's Information Manual.

Upwind and crosswind entries are no longer mentioned. Is this by design? If so, it seems to me we are creating a potential hazard by funnelling all aircraft to one entry point in the vicinity of an airport.

Your comments concerning this matter will be very much appreciated. Thank you.

Phillip Aschinger
Culver, IN

The design of traffic patterns at uncontrolled airports takes into account such factors as terrain, obstacles, noise sensitive areas, airport layout, nearby airports, and airspace use. Although it may seem that "funnelling" to one entry point in a traffic pattern may create a hazard, standardization of arrival and departure flight paths around airports usually results in increased safety. Anticipation of the point where other aircraft may enter the traffic pattern has been found to minimize the need for unexpected maneuvers approaching or departing an uncontrolled airport.

Entry to the traffic pattern is not limited by regulation to the downwind leg. However, it is a highly recommended practice which, when complemented by timely self-announce procedures, goes a long way toward improving overall safety.

• Cheaper by the Dozen

I found your article on the status of the Federal Air Regulations (November/December 1984) very helpful. However, I've heard that it is much less expensive to order a complete set, rather than selecting one here and one there. Is that true?

Lee George
Minot, ND

Yes, it is. The complete FAR's are published in three bound volumes, which are part of a series known as Title 14 of the Code of Federal Regulations. The only disadvantage is that bound volumes are updated but once a year in January, so you would not receive the latest changes as they come out unless you send for them—and pay separately for them.

The three volumes pertinent to the FAA may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Their stock numbers, which should be used in ordering, are:

Parts 1-59	022-003-95309-4	$13
Parts 60-139	022-003-95310-8	$13
Parts 140-199	022-003-95311-6	$7

FAA GENERAL AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA GENERAL AVIATION NEWS, AFO-807, Washington, D.C. 20591.

• R_x for Flying

As an AME and CFII, I'd like to make a few comments about "The Internal Barometer" in the September/October 1984 issue.

I agree—the use of nasal sprays is accepted, but you didn't mention the "rebound effect": After two or three days of continual use, when the spray effect subsides, the congestion could recur, actually worse than before. These sprays become less and less effective with repeated use and it's almost like an addiction—increased need with less effect. Occasional use of nasal sprays—as you mentioned in the article—will not usually produce this problem.

One thing that pilots conscious of protecting their hearing may not be aware of is that using ear plugs that are too tight may be as bad as using none at all. Too tight plugs can block off the free flow of air and create a space between the ear drum and plug that can expand during ascent causing pain and temporary hearing loss.

The best advice is still not to fly with a cold or nasal symptoms.

Dr. Ralph Swerdlow
Sacramento, CA

• Thanks, I Needed That

Recently, I was examined for an Instrument Flight Rules rating by an FAA pilot examiner. After a long flight test, I failed—primarily because I was unable to demonstrate reasonable proficiency on an NDB approach under (simulated) partial panel conditions. During the post-flight talk with the examiner, he pointed out something extremely important that my flight instructor had not.

If you are in actual IMC with a partial panel, the only sensible thing to do is not to struggle with it on your own, possibly endangering your life, your passengers lives, and the lives of people on the ground. Declare an emergency and get all the help you can. I'd rather explain the problem later to the FAA than be tagged as part of the probable cause in an NTSB investigation.

My examiner deserves credit for designing the checkride so that a student who was not up to the mark would at least learn something from it. I hope I pass my next one, but I can honestly say failing this one with this examiner was well worth it.

Name Withheld

An unusual admission, to say the least.

INSTRUMENT CORNER

• 'Copter Instrument Rating

In view of the general language contained in FAR § 61.183(c)(2), which states that a person must have "an instrument rating" in order to qualify for an airplane CFI rating, might a pilot with a helicopter pilot instrument rating qualify for an airplane CFI without obtaining an airplane instrument rating, all other qualifications having been met.

Frank B. Angarola
Decatur, AL

Negative. To give instruction in an airplane, the individual would have to have an airplane instrument rating, along with all other pertinent qualifications.

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Famous Flyers

(continued from p.11)

which its inventor called the "life preserver of the air." Although parachutes had been in use for over 100 years, no one had ever given serious thought to their use as an escape device for the pilot of a stricken aircraft. In the view of manufacturers and military organizations, too many aircraft would be abandoned summarily in flight if the pilot were given an easy way out. Anyway, who knew whether it would actually work for the pilot of an airplane, moving at high speed?

Charles Broadwick was certain it would. Working together with aviation pioneer Glenn Martin, he devised a "trap door" seat in the forward section of the Curtiss "pusher" Martin was flying. At an altitude of 2,000' Tiny, wearing the coatpack chute, pulled a lever which opened the trap seat and dropped her out of the airplane. Her chute opened as scheduled and Tiny became the first female to parachute out of an airplane in flight. The date was June 21, 1913; the site, Griffith Park in Los Angeles.

This "life preserver of the air" was exhibited all over the country by Broadwick, Tiny and Martin over the next two years. In 1915, while taking part in the San Francisco World's Fair, Tiny's airplane experienced wing separation and crashed, killing the pilot. Tiny was able to leap clear and release her coatpack, which opened in time to save her life—one of the first lives to be saved in this manner.

In that same year Broadwick and Tiny finally persuaded the U.S. Army's Aviation Bureau to observe an official demonstration of a parachute jump from an airplane in flight. On March 8, Tiny completed a series of successful "escapes." On one occasion her static lines did become entangled in the tail assembly before the jump but the veteran jumper calmly pulled out her knife and cut the line free. She then made her jump and opened her chute by means of the release cord; she landed safely. The Doll Girl was the darling of the Press observers, who pressured the Army into capitulating.

A few weeks later Broadwick received the first military order for parachutes, inaugurating a new epoch in aviation safety. During World War I over 800 pilots escaped death by means of a parachute. Over the next half century, an estimated 100,000 airplane occupants, civilian and military, bailed out of aircraft safely.

In 1922, after 1,000 jumps, Tiny called her career quits, and settled down to marriage and bringing up a family. She lived until the age of 83, becoming a kind of patron saint of the resurgent sport of parachuting. Her descendents are still active in that field in her old hometown of Henderson, NC.

Although Tiny never received a license to fly, she contributed to the popularity and safety of flight in a unique way. She could also be said to have been one of the first to fly "with no visible means of support."

Editor's note: A preceding article on this subject appeared in the November/December 1984 issue of this publication. ■

Pilot popping pills
Gives everybody chills